REMARKS

This Amendment is filed in response to the FINAL rejection mailed on July 2, 2007, and in the Request for Continued Examination (RCE). All objections and rejections are respectfully traversed.

Claims 1-15, 19, 20, and 23-39 are in the case.

Claims were amended to better claim the invention.

Claims 23 – 39 were added to better claim the invention.

Claims 16-18, and 21, 22 were cancelled without prejudice.

Request for Interview

The Applicant respectfully requests a telephonic interview with the Examiner after the Examiner has had an opportunity to consider this Amendment, but before the issuance of the next Office Action. The Applicant may be reached at 617-951-3028.

At Paragraphs 2 – 20 Claims 1-15, and 19-20 were rejected under 35 U.S.C. 103(a) as being obvious over Haskin et al. U. S. Patent Application Publication No. 2003 / 0158863 Published August 21, 2003 (hereinafter Haskin), in view of Wang-Koop et al. U. S. Patent No. 6,571,261 Issued May 27, 2003 (hereinafter Wang-Koop).

Applicant's claimed invention, as set forth in representative claim 1, comprises in part:

1. (Currently Amended) A method for operating a data storage system, comprising:

creating a writable virtual disk (vdisk) at a selected time, the writable vdisk referencing changes in data stored in the data storage system after the writable vdisk was created, the writable vdisk having a plurality of holes where each hole is at locations referencing data which has not been changed since the writable vdisk was created;

maintaining a backing store, the backing store referencing data stored in the data storage system which has not been changed since the writable vdisk was created;

loading blocks of the writable vdisk from a disk into a memory, the loaded blocks including a writable vdisk indirect block having a plurality of fields, each field storing a valid pointer to a data block or an invalid pointer representing a particular hole of the plurality of holes;

loading blocks of the backing store from a disk into the memory, the loaded blocks including a backing store indirect block having a plurality of fields, each backing store indirect block field corresponding to a field of the writable vdisk indirect block, one or more backing store indirect block fields having a pointer to a data block;

searching each field of the writable vdisk indirect block for a hole; and

replacing each field having a hole in the writable vdisk indirect block with a new pointer to the data block referenced by the corresponding backing store indirect block field to update the writable vdisk to reference both the data which is unchanged since the writable vdisk was created and the data which has been changed since the writable vdisk was created.

Haskin discloses a file system. The file system is updated by capturing a snapshot of the active file system, and the process involves moving some of the data blocks into a

shadow inode file. Also a new snapshot with "ditto" addresses of data blocks is created during the update process.

Wang-Knopp discloses a defragmentation utility. The defragmentation utility finds blank block spaces between data blocks in a disk storage unit and moves the data blocks so as to fill up the spaces.

Applicant respectfully urges that neither Haskin nor Wang-Knopp has any disclosure of Applicant's claimed novel

creating a writable virtual disk (vdisk) at a selected time, the writable vdisk referencing changes in data stored in the data storage system after the writable vdisk was created, the writable vdisk having a plurality of holes where each hole is at locations referencing data which has not been changed since the writable vdisk was created;

maintaining a backing store, the backing store referencing data stored in the data storage system which not been changed since the writable vdisk was created;

. . .

searching each field of the writable vdisk indirect block for a hole; and

replacing each field having a hole in the writable vdisk indirect block with a new pointer to the data block referenced by the corresponding backing store indirect

block field to update the writable vdisk to reference both the data which is unchanged since the writable vdisk was created and the data which has been changed since the writable vdisk was created.

More particularly, Applicant respectfully urges that neither Haskins nor Wang-Koop has any disclosure of Applicant's claimed

creating a writable virtual disk (vdisk) at a selected time, the writable vdisk referencing changes in data stored in the data storage system after the writable vdisk was created, the writable vdisk having a plurality of holes where each hole is at locations referencing data which has not been changed since the writable vdisk was created;

maintaining a backing store, the backing store referencing data stored in the data storage system which has not been changed since the writable vdisk was created.

Haskins uses a snapshot of his dataset to reference a complete and up to date copy of his dataset at a particular point in time. Applicant respectfully urges that Haskins has no disclosure of Applicant's claimed novel *, the writable vdisk referencing changes in data stored in the data storage system after the writable vdisk was created, the writable vdisk having a plurality of holes where each hole is at locations referencing data which has not been changed since the writable vdisk was created*

and also *maintaining a backing store, the backing store referencing data stored in the data storage system which has not been changed since the writable vdisk was created*.

Further, Applicant respectfully urges that neither Haskins nor Wang-Knopp has any disclosure of Applicant's claimed *searching each field of the writable vdisk indirect block for a hole; and*

replacing each field having a hole in the writable vdisk indirect block with a new pointer to the data block referenced by the corresponding backing store indirect block field to update the writable vdisk to reference both the data which is unchanged since the writable vdisk was created and the data which has been changed since the writable vdisk was created.

The Examiner urged that Haskin at his Paragraphs 0053 and 0063 (Pages 3-4 of the Office Action) discloses a valid pointer to a data block and an invalid pointer to a hole. However, at his Paragraph 0053 Haskin simply describes a database file structure using pointers in indirect blocks, and is completely silent concerning Applicant's claimed

creating a writable virtual disk (vdisk) at a selected time, the writable vdisk referencing changes in data stored in the data storage system after the writable vdisk was created, the writable vdisk having a plurality of holes where each hole is at locations referencing data which has not been changed since the writable vdisk was created.

Further, Haskin at his Paragraph 0063 discloses pointers located in indirect data blocks, and the pointers point to his data blocks.

Also, Wang-Knopp has no disclosure of these features of the claimed invention.

The Examiner asserts that Wang-Koop at his Col. 3 Lines 23-27 discloses a de-fragmentation utility which works offline, and so provides motivation to combine a de-fragmentation utility with Haskin's disclosure of indirect blocks having pointers to data blocks, and so renders obvious Applicant's claimed novel

searching each field of the writable vdisk indirect block for a hole; and

replacing each field having a hole in the writable vdisk indirect block with a new pointer to the data block referenced by the corresponding backing store indirect block field to update the writable vdisk to reference both the data which is unchanged since the writable vdisk was created and the data which has been changed since the writable vdisk was created.

Applicant respectfully asserts that neither Haskin nor Wang-Koop have any disclosure of Applicant's claimed *searching each field of the writable vdisk indirect block for a hole* , where the hole is defined in the claim as *holes where each hole is at locations referencing data which has not been changed since the*

writable vdisk was created . Wang-Knopp's hole is a space on his disk where no data is recorded. In sharp contrast, Applicant's hole is a reference to *data which has not been changed since the writable vdisk was created* . Accordingly, Applicant respectfully urges that Wang-Knopp's hole has no relationship to Applicant's hole.

Again, Applicant respectfully urges that neither Haskin nor Wang-Knopp has any disclosure of Applicant's claimed novel invention, and so taken either singly or in combination are legally incapable of rendering Applicant's claimed novel invention obvious under 35 U.S.C. 103 because of the absence in both of Applicant's claimed

creating a writable virtual disk (vdisk) at a selected time, the writable vdisk referencing changes in data stored in the data storage system after the writable vdisk was created, the writable vdisk having a plurality of holes where each hole is at locations referencing data which has not been changed since the writable vdisk was created;

maintaining a backing store, the backing store referencing data stored in the data storage system which has not been changed since the writable vdisk was created;

     . . .

searching each field of the writable vdisk indirect block for a hole; and

replacing each field having a hole in the writable vdisk indirect block with a new pointer to the data block referenced by the corresponding backing store indirect block field to update the writable vdisk to reference both the data which is unchanged

since the writable vdisk was created and the data which has been changed since the

writable vdisk was created.

NEW CLAIMS

Applicant's claimed invention, as set forth in representative new claim 23 comprises in

part:

23.   A method for operating a data storage system, comprising:
    creating a writable virtual disk (vdisk) at a selected time, the writable vdisk referencing changes in data stored in the data storage system after the writable vdisk was created, the writable vdisk having a plurality of holes where each hole is at a location referencing data which has not been changed since the writable vdisk was created;
    maintaining a backing store, the backing store referencing the data stored in the data storage system which has not been changed since the writable vdisk was created;
    searching each field of the writable vdisk for a hole; and
    referencing each hole in the writable vdisk to point to the data block referenced by the corresponding backing store indirect block to update the writable vdisk to reference both the data which is unchanged since the writable vdisk was created and the data which has been changed since the writable vdisk was created.

Again, Applicant respectfully urges that neither Haskin nor Wang-Knopp

has any disclosure of Applicant's claimed

creating a writable virtual disk (vdisk) at a selected time, the writable vdisk referencing changes in data stored in the data storage system after the writable vdisk was

created, the writable vdisk having a plurality of holes where each hole is at locations referencing data which has not been changed since the writable vdisk was created;

maintaining a backing store, the backing store referencing data stored in the data storage system which has not been changed since the writable vdisk was created;

. . .

searching each field of the writable vdisk indirect block for a hole; and

replacing each field having a hole in the writable vdisk indirect block with a new pointer to the data block referenced by the corresponding backing store indirect block field to update the writable vdisk to reference both the data which is unchanged since the writable vdisk was created and the data which has been changed since the writable vdisk was created.

Further, Applicant respectfully urges that both Haskin and Wang-Knopp teach away from Applicant's claimed novel invention, and so could not be combined by a person of ordinary skill in the art because of the divergent teachings of each.

If a person of ordinary skill in the art followed Haskin, then the person would be led to believe that a file system could be only represented by a sequence of snapshots, so that failure of a computer could be corrected by a restore operation, as shown in his Figs.

15B, 15C, and 15D. That is, Haskin has no disclosure of Applicant's claimed *searching each field of the writable vdisk indirect block for a hole; and*

replacing each field having a hole in the writable vdisk indirect block with a new pointer to the data block referenced by the corresponding backing store indirect block field to update the writable vdisk to reference both the data which is unchanged since the writable vdisk was created and the data which has been changed since the writable vdisk was created.

If a person of ordinary skill in the art were to follow the teachings of Wang-Knopp, then the person would be led to believe that the only reason for searching a data storage device would be to close up blank spaces in the device where data is not stored. That is, Wang-Knopp has no disclosure of Applicant's claimed *searching each field of the writable vdisk indirect block for a hole; and*

replacing each field having a hole in the writable vdisk indirect block with a new pointer to the data block referenced by the corresponding backing store indirect block field to update the writable vdisk to reference both the data which is unchanged since the writable vdisk was created and the data which has been changed since the writable vdisk was created.

Applicant's hole references data that has not been changed since the vdisk was created. Wang-Knopp's hole is a blank space where data has not been stored on a disk. The concepts bear no relationship to one another.

Accordingly, following the teachings of either or both of Haskin and Wang-Knopp leads away from Applicant's claimed invention.

Thus, both Haskin and Wang-Knopp are each singly legally incapable of rendering Applicant's claimed invention obvious under 35 U.S.C. 103. Further, both Haskin and Wang-Knopp, when combined, teach away from Applicant's claimed invention, and so are legally incapable of rendering Applicant's claimed invention obvious under 35 U.S.C. 103.

All independent claims are believed to be in condition for allowance.

All dependent claims are dependent from independent claims which are believed to be in condition for allowance. Accordingly, all dependent claims are believed to be in condition for allowance.

Favorable action is respectfully solicited

Please charge any additional fee occasioned by this paper to our Deposit Account

No. 03-1237.

Respectfully submitted,

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